ENGINEERING
McMaster-Mohawk
Bachelor of Technology
Partnership

McMaster University

Course Outline

1. COURSE INFORMATION

Session Offered	Fall 2020	
Course Name	Engineering Statistics	
Course Code	ENGTECH 2ES3/3ES3	
Date(s) and Time(s) of lectures	2ES3 Lecture: Wednesday 11:30 - 1:20 |Tutorials: Friday 12:30, 1:30, 2:30 3ES3 Lecture: Thursday 8:30 - 10:20 | Tutorials: Monday 9:30, 12:30, 1:30	
Program Name	Automotive and Vehicle Engineering Technology; Automation Engineering Technology; Biotechnology	
Calendar Description	An introductory statistics course covering the following topics with engineering applications: organization and description of data, probability and distributions, confidence intervals and hypothesis testing and bivariate data analysis using regression.	
Instructor(s)	Karen Lawrence, MSc, LEL	Email: lawrek@mcmaster.ca Office: ETB/204 Office Hours: By appointment only

2. COURSE SPECIFICS

Course Description

The course introduces statistical methods for estimation, inference (hypothesis testing) and regression analysis. The course integrates the concepts and theorems of probability, probability distributions and their mathematical functions, random variables (both continuous and discrete), random sampling and the distinctive nature of samples drawn from populations. The emphasis is on practical decision making.

Instruction Type

Code	Type	Hours per term
C	Classroom instruction	
L	Laboratory, workshop or fieldwork	
T	Tutorial	
DE	Distance education	36
	Total Hours	36

Resources

ISBN	Textbook Title & Edition	Author & Publisher
9780134769165	***Stats: Data and Models, 3rd Canadian Edition*** ***OR***	De Veaux et al, 2018 Pearson
9780134794594	***eBook: MyLab Statistics with eText (same title)***	Pearson

Other Supplies	Source
• Minitab® Statistical Software • Quality Trainer® • Scientific calculator w/ stat functions (Casio)	Download (Avenue) Registration (Avenue) Bookstore

Prerequisite(s)	ENG TECH 1MT3 and registration in Automotive and Vehicle Engineering Technology; Automation Engineering Technology; Biotechnology
Corequisite(s)	*n/a*
Antirequisite(s)	ENGTECH 3ES3, ENGTECH 2ES3 or ENGTECH 3STS

Course Specific Policies	This course will be using **software**. Students should be aware that, when they access the electronic components of this course, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course instructor. It is expected that students read the material that is coming under discussion **prior to class** and complete assigned homework. Students are expected to actively participate during class sessions offering insight, comment, reinforcement, argument, contrary views and underscoring examples. **Homework**: Your out-of-class homework includes online *Quality Trainer*® modules, chapter exercises, module practice problems, and readings as assigned per module on Avenue. These are the required *minimum preparation* for the quizzes and final exam. **Minitab® Tutorials:** Written instructions on how to use the software, interpret output and connect to statistical concepts. Completed offline as preparation for online **quizzes**. The Minitab® tutorial instructions are found in the Content area of *Avenue*. The link to download Minitab® is found on the course homepage. **Quizzes:** Online. Dates are given in the *Weekly Timetable***.** Assess statistical software competency and conceptual understanding of the topics taught in lecture. One (1) quiz mark will be **dropped.** *NOTE: If an MSAF is submitted for a quiz, that quiz is considered as the dropped mark.* There will be **no make-up/deferred** quizzes. If, in *exceptional documented and communicated circumstances*, a student misses more than one quiz, the value(s) will be applied to the cumulative final examination. **Activities:** Variable formats**.** Low stakes, informed by issues, engaging and provide student agency. Designed to extend course content beyond technical computation and formulation. One (1) activity mark will be **dropped.** *NOTE: If an MSAF is submitted for an activity, that activity is considered as the dropped mark.* There will be **no make-up/deferred** activities. **Midterm.** Online - restrictions and requirements are included. Format TBD. Please note that there are no make-up or deferred midterm examinations in this course. If, for any reason, a student misses the midterm examination, the weight will be applied to the cumulative final examination **(i.e. a missed midterm exam will result in the cumulative final examination being weighted at 55% of the final grade).** **Final Exam (cumulative)**. Online - restrictions and requirements are included. Format TBD MSAF is not permissible for weights on evaluations (i.e. midterm, final exam) that are greater than or equal to 25%. **Any attempt to submit a falsified MSAF for this course**

	for a missed midterm exam constitutes academic dishonesty and charges may be filed with the Office of Academic Integrity.
Departmental Policies	Students must maintain a GPA of 3.5/12 to continue in the program. In order to achieve the required learning objectives, on average, B.Tech. students can expect to do at least 3 hours of "out-of-class" work for every scheduled hour in class. "Out-of-class" work includes reading, research, assignments and preparation for tests and examinations. Where group work is indicated in the course outline, such collaborative work is mandatory. The use of cell phones, iPods, laptops and other personal electronic devices are prohibited from the classroom during the class time, unless the instructor makes an explicit exception. Announcements made in class or placed on Avenue are considered to have been communicated to all students including those individuals that are not in class. Instructor has the right to submit work to software to identify plagiarism.

3. SUB TOPIC(S)	**Details found by Module on *Avenue* and *Weekly Timetable***	
Week 1	Introduction, Organizing and presenting data Describing and Comparing Distributions	Chapters 1, 2,3,4
Week 2	Normal distribution ***Quiz 1***	Chapter 5
Week 3	Correlation and regression	Chapters 6,7,8
Week 4	Probability Probability distributions ***Quiz 2***	Chapters 11,12,13
Week 5	Sampling distributions ***Quiz 3***	Chapters 9, 14
	Break	
Week 6	Inference – One sample tests ***Midterm***	Chapters 15, 16, 17, 18
Week 7	Inference – One sample tests (cont'd) ***Quiz 4***	
Week 8	Inferences – Two sample tests	Chapters 19, 20, 21
Week 9	Inferences – Two sample tests (cont'd) ***Quiz 5***	
Week 10	Analysis of Variance (ANOVA) and ***F***- tests	Chapter 24
Week 11	Regression Inference ***Quiz 6***	Chapters 23
Week 12	Multiple Regression	Chapters 26, 27

Week 13	*Wrap-up*	

Midterm Recess: Monday, October 12 to Sunday, October 18
Classes end: Wednesday, December 9
Final examination period: Thursday, December 10 to Wednesday, December 23
All examinations MUST be written during the scheduled examination period.

Note that this structure represents a plan and is subject to adjustment term by term.
The instructor and the University reserve the right to modify elements of the course during the term. The University may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes.

ASSESSMENT OF LEARNING *including dates*

Tutorials/Quizzes ***(bi-weekly)***	25%
Activities ***(bi-weekly)***	20%
Midterm ***(week 6)***	20%
Final Examination {comprehensive} ***(Exam period)***	35%
TOTAL	**100%**

Percentage grades will be converted to letter grades and grade points per the University calendar.

5. LEARNING OUTCOMES

1. Produce graphical displays and numerical summaries that effectively translate data into information.
2. Critically assess statistically-based results, recognizing whether reported results reasonably follow from the study and analysis conducted.
3. Recognise the central role of *variability* and *randomness* in designing studies and drawing conclusions.
4. Use statistical inference (interval estimation and hypothesis testing) in a variety of settings.
5. Apply statistical models for prediction, inference and distributional analysis.
6. Interpret and draw conclusions from standard output generated by statistical software.

6. COURSE OUTLINE – APPROVED ADVISORY STATEMENTS

ANTI-DISCRIMINATION

The Faculty of Engineering is concerned with ensuring an environment that is free of all discrimination. If there is a problem, individuals are reminded that they should contact the Department Chair, the Sexual Harassment Officer or the Human Rights Consultant, as soon as possible.
http://www.mcmaster.ca/policy/General/HR/Discrimination_Harassment_Sexual_Harassment-Prevention&Response.pdf

ACADEMIC INTEGRITY

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. It is your responsibility to understand what constitutes academic dishonesty.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/

The following illustrates only three forms of academic dishonesty: The following illustrates only three forms of academic dishonesty:

- plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
- improper collaboration in group work.
- copying or using unauthorized aids in tests and examinations.

AUTHENTICITY / PLAGIARISM DETECTION

Some courses may use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. A2L, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, other software, etc.). For more details about McMaster's use of Turnitin.com please go to www.mcmaster.ca/academicintegrity.

COURSES WITH AN ON-LINE ELEMENT

Some courses may use on-line elements (e.g. e-mail, Avenue to Learn (A2L), LearnLink, web pages, capa, Moodle, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

ONLINE PROCTORING

Some courses may use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

COMMUNICATIONS

It is the student's responsibility to:

- Maintain current contact information with the University, including address, phone numbers, and emergency contact information.
- Use the University provided e-mail address or maintain a valid forwarding e-mail address.
- Regularly check the official University communications channels. Official University communications are considered received if sent by postal mail, by fax, or by e-mail to the student's designated primary e-mail account via their @mcmaster.ca alias.
- Accept that forwarded e-mails may be lost and that e-mail is considered received if sent via the student's @mcmaster.ca alias.

Check the McMaster/Avenue email and course websites on a regular basis during the term.

CONDUCT EXPECTATIONS

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the Code of Student Rights & Responsibilities (the "Code"). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, whether in person or online.

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable

participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students' access to these platforms.

ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES

Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) at 905-525-9140 ext. 28652 or sas@mcmaster.ca to make arrangements with a Program Coordinator. For further information, consult McMaster University's Academic Accommodation of Students with Disabilities policy.

REQUESTS FOR RELIEF FOR MISSED ACADEMIC TERM WORK

McMaster Student Absence Form (MSAF): In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar "Requests for Relief for Missed Academic Term Work".

ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students should submit their request to their Faculty Office normally within 10 working days of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests. http://www.mcmaster.ca/policy/Students-AcademicStudies/Studentcode.pdf

COPYRIGHT AND RECORDING

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, including lectures by University instructors

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

EXTREME CIRCUMSTANCES

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.